

**STI STRESS MODIFICATION BY NITROGEN PLASMA TREATMENT FOR
IMPROVING PERFORMANCE IN SMALL WIDTH DEVICES**

ABSTRACT OF THE DISCLOSURE

A method for modulating the stress caused by bird beak formation of small width devices by a nitrogen plasma treatment. The nitrogen plasma process forms a nitride liner about the trench walls that serves to prevent the formation of bird beaks in the isolation region during a subsequent oxidation step. In one embodiment, the plasma nitridation process occurs after trench etching, but prior to trench fill. In yet another embodiment, the plasma nitridation process occurs after trench fill. In yet another embodiment, a block mask is formed over predetermined active areas of the etched substrate prior to the plasma nitridation process. This embodiment is used in protecting the PFET device area from the plasma nitridation process thereby providing a means to form a PFET device area in which stress caused by bird beak formation increases the device performance of the PFET.